BEFORE THE STATE OF WASHINGTON
ENERGY FACILITY SITE EVALUATION COUNCIL

IN RE APPLICATION NO. 99-1

SUMAS ENERGY 2 GENERATION FACILITY

EXHIBIT _____ (TP-T)

APPLICANT'S PREFILED DIRECT TESTIMONY

WITNESS # 7: TED POTTER

Q. Please introduce yourself to the Council.

A. My name is Ted M Potter, P.E.

Q. What is the subject of your testimony?

A. My direct testimony is intended to address the following subjects:

First, I will briefly describe my background and experience.

Second, I will describe the natural gas pipeline that will be constructed as part of the Sumas Energy 2 (SE2) project.

Third, I will explain how safety and environmental protection issues will be addressed in the pipeline design, construction and operation.

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Fourth, I will discuss the risk associated with the pipeline.

Background & Experience

Q. What is your current occupation?

A. I am an Engineering Specialist in the Environment and Energy Systems Division of CH2M Hill, based in Seattle, Washington.

Q. What is CH2M Hill?

A. CH2M Hill is a global project delivery firm that provides clients with a full range of engineering, construction and environmental consulting services. CH2M Hill has more than 7000 professionals on staff in offices around the world.

Q. Please describe your background.

A. I am a mechanical engineer with almost twenty years of experience providing management, design and construction services on public and private projects. I have considerable experience with cross-county oil and gas pipeline projects in particular. Since joining CH2M Hill in 1990, I have worked on several projects involving the design and siting of oil and gas pipelines, and prior to joining CH2M Hill, I worked for Chevron Pipe Line Company for 6 years, as a project design engineer, construction engineer and joint venture representative. In these positions, I have contributed to the design, construction, operation and maintenance of cross-country oil and natural gas pipelines. My resume, which is provided as Exhibit ___ (TP-1), describes some of the pipeline projects on which I have worked.

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Q. Were you involved in designing the pipeline that supplies natural gas to the Sumas Cogeneration Facility, which is sometimes referred to as the "SE1 Facility?"

A. Yes. I was the project manager for the design and construction of the natural gas pipeline associated with the SE1 facility in Sumas. I led the team of pipeline engineers and pipeline construction specialists that designed and constructed the cross-country pipeline and the associated pressure-reducing stations, cathodic protection system, and odorization system. I also led the team that drafted the Operations and Maintenance Manual and the Emergency Response Plan for that pipeline.

Q. What is your role in connection with the SE2 Generation Facility project?

A. SE2 has retained CH2M Hill to provide consulting services in connection with the pipeline aspects of the Application for Site Certification. If the SE2 project goes forward, I will be the project manager in charge of the design and construction of the natural gas pipeline. I will also have responsibility for drafting the Operations and Maintenance Manual, and the emergency response plan.

Q. Who are the other members of the pipeline design and construction team?

A. As was the case when we built the pipeline for SE1, I anticipate working closely with Rod Phipps, a pipeline engineer with more than twenty-five years experience in designing and constructing pipelines. I also anticipate working with Ken Green, a registered Geotechnical Engingeer who has worked on pipeline projects for many

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years, and Jerry Duppong, a Chemical Engineer with substantial experience designing cathodic protection systems.

Copies of Rod's, Ken's and Jerry's resumes are provided as Exhibit ___ (TP-2).

Description of Pipeline

Q. Please describe the pipeline proposed as part of the SE2 Project?

A. As part of the project, SE2 proposes to construct a 4.5-mile natural gas pipeline from the U.S.-Canadian border to the SE2 facility site. An existing pipeline owned and operated by Westcoast Energy Inc. delivers natural gas to the U.S.-Canadian border approximately one mile east of Sumas, Washington. Natural gas from that Westcoast pipeline will pass through a pressure-reducing station that will drop the pressure to approximately 480 psi. Within 100 feet of the border, the natural gas will also pass through an odorization station, which will add chemicals to the gas to give it the odor that is commonly recognized as natural gas. The natural gas will then flow through the SE2 pipeline to the SE2 facility, where it will pass through a pressure regulating station and various filters before fueling the combustion turbines.

The pipeline will be built with 16-inch diameter pipe that is 0.375 inches thick. The pipe will meet the latest industry standard, API-5L, and have a specified minimum yield strength of at least 56,000 psi. It will be designed to operate at a hoop strength less than 20% of the specified minimum yield strength (SMYS).

Q Can you describe the route of the proposed pipeline?

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A. A map depicting the pipeline route is provided as Exhibit ___ (TP-3). The pipeline will cross the U.S.-Canadian border east of the City of Sumas. It will then run south and west, and eventually north through the SE1 site, under Halverstick Road, and onto the SE2 Facility site. The pipeline will follow the right of way for the existing pipeline that delivers natural gas to the SE1 facility, which runs primarily through flat agricultural lands. The pipeline will have three water crossings – the Sumas River, Johnson Creek and Bone Creek -- all of which will be accomplished by horizontal directional drilling.

Q. Has SE2 already obtained easements from all of the landowners along the proposed route?

A. Yes. When the SE1 facility and pipeline were built, easements were obtained for a 30-foot wide right of way, with the understanding that the right of way would be sufficient to permit a second natural pipeline to be installed at a later date. Since filing its Application for the SE2 facility, SE2 has met with each of the 14 owners of the land crossed by the pipeline right-of-way. SE2 has agreed to provide additional compensation to the property owners and each has re-affirmed the easement permitting the installtion and maintenance of the proposed pipeline.

Safety & Environmental Protection

Q. Will the pipeline have design features that will minimize the likelihood of a natural gas release?

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A. Yes. The pipeline has been designed to minimize the possibility of an inadvertent release of natural gas. It will meet, and in many cases exceed, federal and state safety requirements. Among other things:

- Pipe. The pipeline will be constructed using API-5L electric resistance welded , low carbon steel pipe. The pipe will be designed to operate at a maximum of 20% of the specified minimum yield strength (SMYS). This is substantially more protective than applicable regulations require. The regulations permit pipelines to operate at 72% of SMYS in Class I areas such as this, and up to 40% of SMYS in Class IV areas, which are the most stringently regulated areas.
- Specified Minimum Yield Strength. The pipeline will be constructed of pipe having a specified minimum yield strength of at least 56,000 psi.
- Pipe Thickness. The pipeline will be constructed of pipe that is 0.375 inches thick. This is roughly twice the thickness that federal regulations require for pipelines that are located in this type of area, which is known as a Class I area. In fact, this pipe will even exceed the thickness requirements for pipelines located in Class IV areas.
- External Pipe Coating. In order to resist corrosion, the pipeline will be coated with fusion-bonded epoxy overlain with a layer of extruded polyethylene. Although federal regulations require only a single layer of coating, SE2 proposes this double layer to provide additional protection.
- Cathodic Protection. The pipeline will be further protected from corrosion by a Sacrificial Anode Cathodic Protection System, with sacrificial anode beds installed at intervals along the pipeline. The system will be designed based on the

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results of a site-specific cathodic protection survey. Test stations will be installed at several locations along the line to facilitate monitoring of the system.

- Valves and Flanges. Valves will meet or exceed the minimum requirements found in 40 C.F.R. § 192.145. Flanges will meet or exceed the minimum requirements found in 40 C.F.R. § 192.147.
- Welds. Pipeline joints will be welded by qualified welders following written welding procedures specifying the methods for welding all required pipeline joints. Welding procedures and pipeline welders will be qualified in accordance with API Standard 1104. The procedures will be submitted to the WUTC for approval prior to construction. During construction, welder qualification records will be available as required by 40 C.F.R. § 192.227, and will include a Coupon Test Report.
- Depth. The pipeline will be buried a minimum of 4½ feet (to top of pipe) to minimize the possibility of inadvertent third-party damage. Warning tape will be placed in the trench above the pipeline to warn anyone who is excavating of the pipeline's location.
- Bedding Material. In order to protect the pipe and its coating, sand or sand-like materials having a diameter no larger than 3/8-inch will be placed in the ditch as bedding material.

Q. How will the pipeline's operation be controlled?

A. The pipeline will be operated from the control room at the SE2 facility. Pressure monitoring devices will be installed at each end of the pipeline to measure the pressure in the pipeline. The control room operators will be able to monitor pressure

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levels at both end of the pipeline. The facility supervisory control system will also be designed to send a signal to close an Emergency Shut Down valve located at the border regulator station under high or low pressure conditions, or if the rate of pressure decay exceeds established parameters.

Q. Will the pipeline have emergency shutdown valves?

A. Yes. The pressure regulation station located at the U.S.-Canadian border will be designed to prevent the line pressure from exceeding the maximum allowable operating pressure (MAOP), which will be 499 psig. The pipeline will have two isolation valves. An emergency shut down valve will be installed at the regulator station within twenty feet of the border. Another valve will be located at the SE2 facility. Blow down stations that will allow the safe release of natural gas to the atmosphere in the event of an emergency will be located at the regulator station and at the SE2 facility.

Q. Following construction, will the pipeline be tested to ensure its integrity?

A. Yes. There will be a variety of tests during and after construction. During construction, 100% of the welds will be inspected radiographically by a qualified radiographer, even though federal regulations only require that 10% of the welds be radiographed. Any defects found in the welds will be replaced or repaired, and then tested again. The external corrosion-resistant coating will also be "jeeped" to detect any defects in the coating, and defects will be repaired.

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Following construction, SE2 will conduct a 24-hour hydrostatic test at not less 150% of the maximum allowable operating pressure (MAOP), and SE2 will perform an internal line inspection with an internal inspection device commonly known as a "smart pig." In addition, SE2 will inspect the cathodic protection system following construction. It will conduct a continuous potential survey to verify the effectiveness of the cathodic protection system. SE2 will also conduct a stray to check for possible interference caused by other utilities in the area.

Q. Will SE2 continue to perform any of these tests once the pipeline is operational?

A. Yes. Operators will monitor the pipeline continuously from the SE2 facility control room. In addition, SE2 will conduct monthly leak detection surveys, inspecting the right of way visually and with flame ionization gas detectors. SE2 will also conduct smart pig inspections during major plant shutdowns, which occur approximately every five years. SE2 will monitor the effectiveness of the cathodic protection system on a regular basis, inspecting the system twice a year and conducting a continuous potential survey once every two years following construction.

Q. In your opinion, is there anything more SE2 should be doing to maintain the safety of the pipeline?

A. No. When SE2 retained me, they asked me to identify all of the safety features that I would recommend, and SE2 decided to incorporate all of my recommendations. In fact, we discussed some items that were not required by applicable regulations and that I did not believe were necessary for the safe operation of the pipeline, but SE2

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nonetheless decided to include these design features to provide an added measure of safety.

Risk of A Natural Gas Release

Q. In light of the various safeguards you've described, does the pipeline associated with this project present an unreasonable risk?

A. No. There are literally hundreds of thousands of miles of natural gas pipeline in the United States, and those pipelines have proven to be a safe and effective means of transporting natural gas. The pipeline associated with SE2 Facility is a relatively short pipeline. It will not be very susceptible to the more common causes of pipeline releases, and as explained above, SE2 has gone far beyond the federal and state regulatory requirements in designing the pipeline.

Q. What do you mean when you say that this pipeline would not be very susceptible to the more common cause of pipeline releases?

A. In considering the risks associated with pipelines, it is important to look at the sorts of things that are typically associated with pipeline releases. In practice, natural gas pipeline releases tend to result from third-party damage, landslides, corrosion, or operator error. None of these factors are likely to cause a release from the SE2 pipeline.

First, third-party damage is unlikely. The pipeline is 4.5 miles long, and runs through land owned by only 14 people. SE2 has met with each of those property owners, so they are aware of the presence of the pipeline. The pipeline will also be marked with

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above-ground signage, as well as in-ground warning tape that would alert someone of the pipeline's presence if they were digging in the area. SE2 will bury the pipeline at least 4 ½ feet deep (to the top of the pipe) to ensure that agricultural equipment can pass over the pipe without causing any damage. With these precautions, third-party damage is unlikely. In fact, the SE1 pipeline has not experienced any problems from third-party damage.

Second, damage caused by landslides or mass movement is unlikely. The pipeline will be routed through flat agricultural land that is not prone to landslides or any other sort of mass movement.

Third, corrosion damage is unlikely. SE2 will utilize corrosion-resistant coating, and maintain a cathodic protection system to minimize corrosion. SE2's periodic smart pig inspection of the line should permit the detection of any corrosion-induced damage long before it would result in a release.

Finally, it is unlikely that a pipeline release would result from operator error. SE2 will employ qualified operators and provide them with appropriate training. Although SE2 cannot guarantee that operator error will not occur, the pipeline will be designed to minimize the consequences of any such error. For example, automatic emergency shutdown valves will prevent the pipeline from exceeding maximum allowable operating pressure.

Q. Has there ever been any problem with the existing SE1 pipeline?

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A. Not to my knowledge. The existing pipeline has been in operation since 1992, and there has never been an inadvertent release of natural gas from that pipeline.

Q. If a release from the pipeline occurred, how would SE2 respond?

A. SE2's response would be governed by the Emergency Response Plan that SE2 will prepare pursuant to 49 C.F.R. § 192.615. In general, SE2 would respond to a release by shutting down the pipeline, notifying appropriate authorities and following the SE2 Operations and Maintenance Manual (which includes the Emergency Response Plant) for the safe repair of the leak area. It is important to understand that, unlike liquid refined petroleum products, natural gas is lighter than air. Once the flow of natural gas is cut off, the released gas would quickly dissipate in the atmosphere. It would not pool on the ground and flow into nearby waterways creating a potential hazard.

END OF TESTIMONY

I declare under penalty of perjury that the foregoing testimony is true and correct to the best of my knowledge.

DATED: April 18, 2000.

By _____
Ted Potter

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